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AUTHOR(S):

MORI, MASUTA; OGAWA, RYOKEI

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Osteoplastic Partial Laminectomy for Removing the Lumbar Disc Herniation

by

MASUTA MORI and RYOKEI OGAWA

From the Dept. of Orthopedic Surgery, Kansai Medical School

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INTRODUCTION

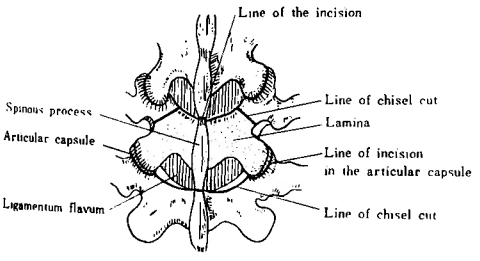
In the following, the technique of surgery now being used in our clinic, since its introduction by Prof. Masuta Mori, for the operative removal of lumbar disc herniation in patients presenting the sciatica syndrome will be described.

The characteristics of this surgical procedure is that the large portion of the unilateral vertebral arch at the level of the affected lumbar interspace can be restored to its original seat by first undertaking block dissection (removal) of the vertebral arch opposite the lesioned disc in order to secure a wide exposure for the safe removal of the protruded disc.

HISTORICAL REVIEW

Before describing this surgical procedure in detail, an explanation of the term "Osteoplastic Laminectomy" and its past history will be briefly reviewed. Osteoplastic laminectomy may well be defined as a special kind of laminectomy exclusively available for the surgical treatment of lumbar disc herniation in which treatment block removal of the vertebral arch is followed by its restoration into the original seat on completion of the disc removal.

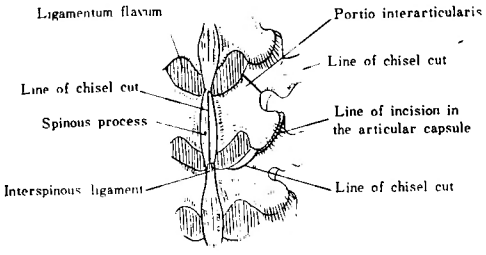
This technique and concept was first introduced in 1949, by Prof. Emeritus E. Kondo, Orthopaedic Department of Kyoto University Medical School, whereby operative removal of the spine involved almost the entire posterior structure of a single lumbar vertebra in so far as the aim of the surgery at one disc space is concerned (Fig. 1).



Spotted area indicates the extent of block removal of the spine

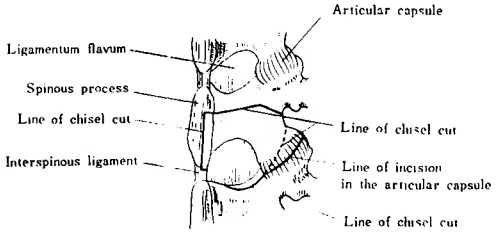
Fig. 1 Osteoplastic Laminectomy

This first technique was soon discarded because of its too extensive surgical intervention and was replaced by a similar technique 1951 in which the unilateral half of the spinous process, the unilateral vertebral arch together with the short remaining stump of the superior articular process and the unilateral



Spotted area indicates the extent of block removal of the spine

Fig. 2 Osteoplastic Hemilaminectomy



Spotted area indicates the extent of block removal of the spine.

Fig. 3 Osteoplastic Partial Laminectomy

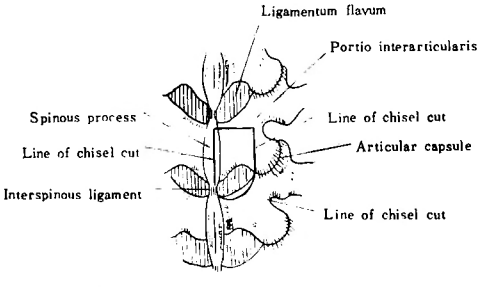
entire articular process are involved. This technique is now referred to as Osteoplastic Hemilaminectomy (Fig. 2) and is still being used in some clinics in Japan.

A further revision of this technique was undertaken by Prof. Kondo himself in 1954 by which he was able to further reduce surgical intervertion. This revised technique was named as Osteoplastic Partial Laminectomy in which a much smaller area of the spine comprising only the large portions (about caudal four fifths) of both vertebral arch and of the spinous process and the entire inferior articular process on the side of the lesion are involved to result in an efficient reduction in surgical attack (Fig. 3). Since then, this technique has become popular under the name of Osteoplastic Partial Laminectomy and is now recognized as one of the best procedures in disc surgery in Japan, because of its having produced many excellent results according to the litrature so far.

MODIFIED TECHNIQUE OF OSTEOPLASTIC PARTIAL LAMINECTOMY BY PROF. M. MORI

Quite recently (1962) in the Department of Orthopaedic Surgery in Kansai Medical School, Prof. Masuta Mori, once a student of Prof. E. Kondo, was able to minimize the surgical damage associated with Osteoplastic Partial Laminectomy by the introduction of another new technique of similar type, the modified technique of Osteoplastic Partial Laminectomy, which has proved most successful as can be supported by the data, available on inquiry, on the follow up results and the clinical results in more than one hundred cases.

In this present paper only the technique itself will be described.



Spotted area indicates the extent of block removal of the spine.

Fig. 4 Modified Method of Osteoplastic Partial Laminectomy (Mori)

SURGICAL TECHNIQUE

As compared with the previous technique (Fig. 3) the tissue of operative removal en bloc is further reduced in that the surgical attack involves only the caudal four fifths portion of the unilateral vertebral arch and of the spinous process joined only with the narrow bony band excentrically situated at the medial side of the inferior articular process. (Fig. 4) (so that most of the process should remain intact.)

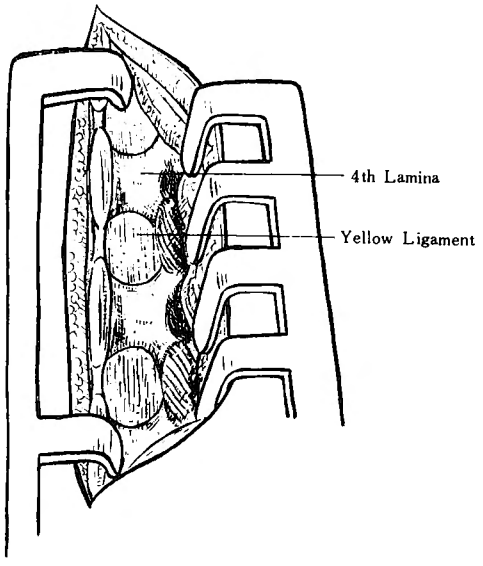
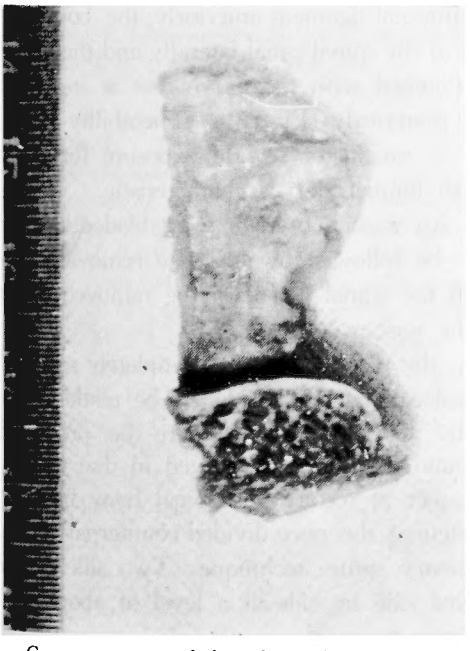


Fig. 5 Unilateral Dorsal Approach



Gross appearance of the 4th vertebral arch together with spinous process wich are removed en bloc.

Fig. 6

The incision of the soft subcutneous tissue, fascia, ligaments, etc. related to the surgical approach to the lumbosacral supporting structure (Fig 5), and necessary to reach both the 4th and 5th intervertebral spaces may be neglected here because they are identical in almost every surgical technique in dorsal removal of the disc.

The subperiosteal detachment of the dorsal muscles from the posterior structure of the affected lumbosacral structure from 4th and 5th lumbar and first sacral laminae with the yellow ligaments in between them are completely carried out on the side of the lesion. Then the self retaining retractor is fixed to secure a satisfactory surgical exposure to admit easy removal of the superficial layer of the yellow ligament at each level of the 4th and 5th interlaminar spaces by use of a small scalpel, forceps, and sometimes, Kocher's hemostat sharply and bluntly.

For the removal of the spinal bony block a thin bladed chisel 5 mm in breadth is preferable. At first the point corresponding to about 3 mm caudal to the line of insertion of yellow ligament on the cranial margin of the vertebral arch and 3 mm medial to the outer border of the interarticular portion (portio interarticularis) of the spine should be defined from where the bony cut by the chisel in the sagittal plane is made so as to descend vertically and caudal-wards from the cranial until the caudal end of the inferior articular process is reached. This descending bony cut should correspond to 1 mm lateral to the medial margin of the superior articular facet of the 5th vertebra hidden by the inferior articular process of 4th spine.

A horizontal bony cut is then made transversely toward midline into the spinous process beginning from the previous starting point for about 10 to 15 mm by using two or three different type of chisel. After that, the spinous process of the 4th spine is exposed

at its entire dorsal apex, where the bony cut along the midline of the apex is employed at its caudal four fifths area, as if the process were exactly divided into two halves. As soon as this midline cut of the spinous process fuses completely with the transverse cut of the vertebral arch, the spinal bony block, comprising approximately four fifths portion of both spinal process and of the vertebral arch joined with small bridge-like bony tissue of the inferior articular process, becomes suddenly removable en bloc without difficulty by use of boneforceps or scissors or both (Fig. 6).

The above is the most important and characterizing part of this operative procedure. Then, the deep layer of yellow ligament and the remnant of its superficial layer together with all the bony tissues into which every deep layer of the ligament is firmly inserted is to be removed. All such bony tissues with the yellow ligament inserted into them are chiselled off from the neighbouring spinal bone and completely removed.

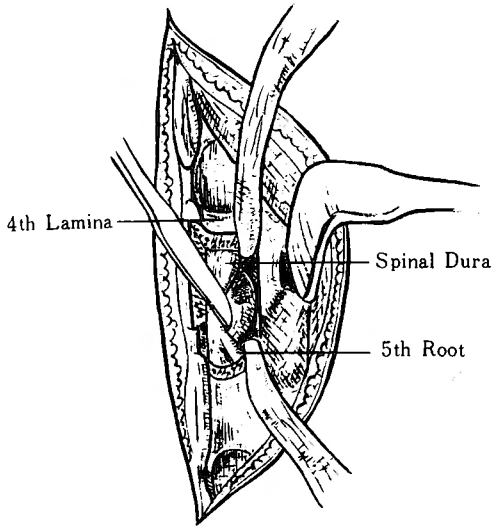


Fig. 7 Operative Exposure

Now, the spinal dura with the overlying fat tissue together with the lesioned root become visible. By removing fat and driving the compressed root away from its original place toward the midline with one or two spatulas, a wide scope for the protruded disc can satisfactorily be obtained. At the same time, to secure hemostasis, two small strips of gauze should be packed into each of the slits resulting from dissection of the posterior longitudinal ligament anteriorly, the bony side wall of the spinal canal laterally and the spinal dura joined with the narve root at its caudal part posteriorly (Fig. 7). The ability to obtain a satisfactory wide exposure for every fourth lumbar disc is characteristic.

An incision with a short bladed knife is made in an encircling fashion into the disc to be followed by adequate removal of its contents. It must be mentioned that every disc in the spinal canal can be removed under direct vision by the operator and to any extent he wishes.

By the use of curettes, pituitary forceps etc., the disc can now be completely removed at the 4th inter-vertebral space, and then the exploration should always be made at the 5th space according to the interlaminar approach. On exploration, where the protruded disc causing the first sacral root compression is found, it must be removed in due course.

After completing these procedures, the maneuver to restore the spinal bony block to its original seat is done without difficulty by fastening the once divided counterpart to the side of the remaining spinous process by the ordinary suture technique: Two silk strings are drawn through two corresponding holes drilled side by side at a level of about 5 to 10 mm distant from the apex of the spinous process removed.

For the remaining counterpart of the spinous process, these two strings are made to pass through a single drill hole, the entrance to which is situated on the medial cut surface of the process more deeply than the corresponding two drill holes mentioned above

with its outlet on the dorso-lateral surface at the central part of the remaining apex. By tying these two strings, a suture firm enough to secure a normal anatomical condition, not only of the spinous process but also the entire bony structure of the affected vertebra, can easily be brought about. And thus, through such simple suture devices, the spinal bony block can be stabilized at the place of reduction into the original seat.

Finally, the suture of all soft tissue including supra-and interspinous ligament or fascia lumbo-dorsalis and the skin etc. can be done and the total procedure of disc removal can be said to have been completed.

Plaster jacket immobilization of the surgical site for from 3rd to 6th week followed by the use of a simple supporting appliance to the lumbar region for the following four weeks is all that need to be done postoperatively. Patients can usually return to work from the beginning of the 4th postoperative month and can even be able to do manual labour before the elapse of the 6 months following this surgery.

SUMMARY

Precise description of our new technique called as Osteoplastic Partial Laminectomy for the operative removal of the lumbar disc herniation is given together with the brief history of its developmental background. And the advantageous feature characterizing this operative procedure is also reviewed.

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和文抄録

腰部椎間板ヘルニヤに対する Osteoplastic Partial Laminectomy

関西医科大学整形外科学教室
森 益 太・小 川 亮 恵

我々が1962年秋以来実施している腰部椎間板ヘルニア摘出術 Osteoplastic Partial Laminectomy（骨形成的部分的椎弓切除術）の詳細な術式を紹介し，併せて1949年以後本邦整形外科学会に於いて独自の発展と成長をとげた所謂 Osteoplastic Laminectomy なる術式の概念と歴史的考察とを試みた．本文記載の新術式は従来の Osteoplastic Partial Laminectomy に対する変法 modified method と云い得るものであつて，偏側椎弓と同側二分の一棘突起の各々尾側略 4/5 を一塊として摘出し且つ還納し，従来手術の対象となつていた偏側の下関節突起の大部分は手術の対象とならないという利点を有するものである．